

REMARKS

After entry of this amendment, claims 24-26, 28, 29 and 31-53 will be pending for the Examiner's review and consideration.

New claims 52 and 53 have been added. Claim 30 has been canceled without prejudice solely to expedite the allowance of the remaining claims. Applicant expressly reserves the right to file one or more continuation and/or divisional applications directed to the subject matter of the canceled claim and/or subject matter of the present amendments.

Support for new claims 52 and 53 may be found, e.g., at page 14, lines 15-20 of the specification as filed. Therefore, Applicant believes that no new matter has been introduced by the new claims.

I. AMENDMENTS TO THE TITLE, SPECIFICATION, AND ABSTRACT

Applicant has amended the title, specification, and abstract to more particularly point out the embodiments of the Applicant's invention. In particular, the term "graft copolymer" has been changed to "graft polymer."

The present specification makes it understood that poly(M_1) and poly(M_2) can be the same or a different homopolymer or copolymer (page 5, lines 22-23). For example, the present specification makes clear that the present graft polymer can be formed from a component (the backbone, the pendant or both) comprising two or more monomers such as in the following embodiments:

- poly((*N,N*-dimethylacrylamide-co-*N,N*-diethyl-methacrylamide)-g-acrylamide) where the backbone polymer is a copolymer of *N,N*-dimethylacrylamide and *N,N*-diethyl-methacrylamide and the pendant polymer is poly(acrylamide) homopolymer (page 5, lines 29-32), and
- poly(*N,N*-dimethylacrylamide-g-(acrylamide-co-*N*-butoxymethyl-methacrylamide-co-*N*-methoxymethyl-acrylamide) where the backbone polymer is poly(*N,N*-dimethylacrylamide) homopolymer and the pendant polymer is a copolymer of acrylamide, *N*-butoxymethyl-methacrylamide, and *N*-methoxymethyl-acrylamide (page 5, line 32 to page 6, line 2).

The specification further discloses, for example, that another exemplary graft polymer of the

invention can be described as:

- a poly(DMA) (“PDMA”) backbone polymer bearing polyacrylamide (“PAAm”) side-chains or pendant chains (page 5, lines 4-6 and 27-29; examples in Section 6.2).

Thus, in embodiments such as the latter the backbone can be a “homopolymer” formed from *N,N*-dimethylacrylamide monomer and the grafted-on pendant can be a “homopolymer” formed from acrylamide monomer. Therefore, to make it clear that neither the backbone nor the pendant need be a copolymer, the term “graft copolymer” has been changed to “graft polymer.”

Applicant further notes that, as used in the present specification, the term “polymer” includes a homopolymer and a copolymer (page 5, lines 15-16).

Applicant further notes that it is well known in the art that in so-called “irregular” polymers, such as graft polymers, in which polymer chains are attached to a main chain, the attached polymer chains are considered to be subunits to the main chain and named in the same way as regular polymers. For example, the reference “Polymer Nomenclature and Structure: A Comparison of Systems Used by CAS, IUPAC, MDL, and DuPont.

3. Comb/Graft, Cross-Linked, and Dendritic/Hyperconnected/Star Polymers,” E.S. Wilks, *J. Chem. Inf. Comput. Sci.* 37:209-223 (1997), a copy of which is provided with the Second Supplemental Information Disclosure Statement filed herewith, teaches that, according to the International Union of Pure and Applied Chemistry, a “graft polymer is defined as a polymer comprising molecules with one or more species of block connected to the main chain as side chains; the side chains have constitutional or configurational features that differ from those in the main chain. In a graft polymer the distinguishing feature of the side chains is constitutional, i.e., the side chains comprise units derived from at least one species of monomer different from those which supply the units of the main chain” (page 212, right column, penultimate paragraph). Thus, the present amendments are compatible with the usage of the term “graft polymer” accepted in the art.

Therefore, Applicant believes that no new matter has been introduced by the above amendments.

As the application has already published as United States Patent Application Publication No. US 2005/0234166 A1 on October 20, 2005, Applicant believes the submission of a substitute specification containing the current amendments is not required.

II. REJECTION OF CLAIM 30 UNDER 35 U.S.C. § 103(a)

Claim 30 has been rejected under 35 U.S.C. § 103(a) as allegedly obvious over WO 2002/00746 A2 of Viovy et al. (“Viovy WO”) which has, as an English language counterpart, United States Patent Application Publication No. 2004/0101970 A1 (“Viovy”), in view of United States Patent No. 6,787,016 B2 to Tan et al. (“Tan”) pursuant to item 7 on pp. 7-8 of the Office Action. Applicant submits that this rejection is moot in light of the cancellation of claim 30 without prejudice herein and therefore respectfully requests that this rejection be withdrawn.

III. REJECTION OF CLAIMS 24-26 AND 28-51 UNDER 35 U.S.C. § 102(e)

Claims 24-26 and 28-51 have been rejected under 35 U.S.C. § 102(e) as allegedly anticipated by Tan pursuant to item 4 on pp. 4-6 of the Office Action. Applicant respectfully traverses.

Specifically, the Office Action contends that Tan discloses “an effective amount of poly(M₁-g-M₂) ... ” (Office Action page 4, lines 18-19) and a “method wherein the poly(M₁-g-M₂) or salt thereof ... ” (Office Action page 5, lines 18-19); that is, the Office Action contends that Tan discloses graft polymers. Applicant respectfully and emphatically disagrees - Tan does not disclose graft polymers. Tan discloses a physical mixture of two polymers.

In particular, Tan teaches that his “dynamic coating” is “a mixed uncrosslinked polymer composition” (col. 2, lines 36-37, emphasis added) where Tan’s “polymeric composition comprises a mixture of polymers where the more hydrophilic polymers [“Component MH”] serve primarily as sieving polymers and the less hydrophilic polymers [“Component LH”] serve primarily as coating polymers” (col. 2, lines 39-42, emphasis added). Tan further discloses that the “polymer composition of the invention comprises a mixture of polymers of different hydrophilicity/hydrobicity, where one component serves mainly a coating function, while the other component serves mainly a sieving function. The polymers may be homo- or copolymers, particularly having a combination of the two” (col. 5, lines 10-15, emphasis added). Tan further discloses that his “synthetic polymers are substantially free of crosslinking (“linear”)” (col. 5, lines 29-30, emphasis added).

Tan's Component MH or sieving polymer can include polyacrylamides and polyethers (col. 5, lines 38-47). Tan's Component LH or coating polymer (col. 5, line 48 to col. 6, line 11) can include homopolymers such as polydimethylacrylamide and polydiethylacrylamide (col. 5, line 67 to col. 6, line 1) and copolymers of two monomers such as *N*-methylacrylamide and *N*-ethylacrylamide (col. 6, lines 3-6). However, Tan makes it clear that each of his Component MH and Component LH is a separate polymer, in contrast to two distinct polymer types chemically connected by a graft(s) as in the molecular architecture of the presently claimed graft polymers.

For example, Tan discloses that when his "polymer compositions are used separately, that is the channel is coated first and then the sample medium is added with the sieving polymer and optionally the coating polymer, ... [P]referably, the sample medium will contain both polymers" (col. 6, lines 18-24, emphasis added; *see also, inter alia*, col. 6, line 58 ("when mixing the two polymers")); col. 7, lines 16-20 ("two solutions are then combined ... precipitation can be avoided by the stepwise careful mixing of the ingredients"); col. 7, lines 53-54 ("polymer solutions may be used separately or may be combined in a single solution for coating and sieving"); col. 8, lines 17-19 ("one or both of the additions of polymer solutions may be repeated, particularly the addition of the more soluble polymer"); claim 1 ("each of a sieving polymer and a channel coating polymer in a weight ratio of 1-10:1, wherein said coating polymer is less water soluble than said sieving polymer").

Furthermore, Tan's examples clearly teach that each of his Component MH and Component LH is a separate polymer, in contrast to two distinct polymer types chemically connected by a graft(s) as in the molecular architecture of the presently claimed graft polymers. Tan's Example 4, entitled "Preparation of LLD30 Hydrophobic Copolymer [i.e., Component LH]," teaches the preparation of "LLD30," a non-crosslinked copolymer synthesized by a free-radical solution polymerization of a 30%:70% mixture of the monomers diethylacrylamide:dimethylacrylamide (col. 9, line 62 to col. 10, line 10, emphasis added). Tan's Example 6, entitled "Preparation of LPA (Linear Polyacrylamide) Hydrophilic Polymer [i.e., Component MH]," teaches the preparation of "LPA," a linear polyacrylamide synthesized from acrylamide monomer (col. 10, lines 52-67, emphasis added). In Tan's Example 7, a "Mixed Sieving Matrix" is prepared from LDD30 (step 5 at col. 11, line 29) and LPA (step 6 at col. 11, line 30) in step 7 by "gently shak[ing] the vial to mix all contents" (col. 11, line 31-34).

It is clear that there is no chemical reaction, such as grafting or graft polymerization, occurring during Tan's Example 7 step 7 - only physical mixing is disclosed. Moreover,

before LDD30 and LPA are brought together in Tan's Example 7 step 7, each component is already a polymer or copolymer, having been chemically polymerized in Examples 4 and 6, respectively. No monomer is present in Tan's Example 7 step 7 so there can be no grafting of a monomer onto any polymer. In contrast, the present specification discloses the polymerization of a monomer(s) onto a polymeric backbone to form a graft polymer comprising pendant polymer chains connected to that backbone (*see, inter alia*, Sections 5.2 and 5.4) and the examples in Section 6.2 of the present specification disclose, e.g., grafting of polyacrylamide onto a polydimethylacrylamide (PDMA) backbone by polymerizing acrylamide (AAm) in the presence of the PDMA.

Applicant also points out that, as discussed above, since Tan teaches that his polymers are substantially free of crosslinking or "linear," Tan's characterization of those polymers is inconsistent with the accepted architecture of a graft polymer. In fact, the term "graft" does not even appear anywhere within Tan's specification or claims.

Thus, for all of these reasons, Applicant respectfully submits that Tan fails to anticipate the present claims. Withdrawal of the rejection of claims 24-26 and 28-51 under 35 U.S.C. § 102(e) is therefore respectfully requested.

IV. REJECTION OF CLAIMS 24-26 AND 28-51 UNDER 35 U.S.C. § 102(a)

Claims 24-26, 28, 29 and 31-51 have been rejected under 35 U.S.C. § 102(a) as allegedly anticipated by Viovy pursuant to item 3 on pp. 2-4 of the Office Action. As does the Office Action, Applicant's remarks herein refer to the Viovy U.S. counterpart rather than Viovy WO. Applicant respectfully traverses.

Viovy teaches that the subject of his invention is a surface treating solution comprising "at least one polymer composed of several polymer segments, said polymer being of the block copolymer or comb polymer type and having on average at least three junction points between polymer segments which are chemically or topologically different in nature" ([0019], emphasis added). Viovy's block polymer is the of the linear block copolymer type well known in the art [0037]-[0038] and, not being a graft polymer, need not be further considered here. Viovy further requires that his comb copolymer "denote[s] a polymer having a linear backbone of a certain chemical nature, and polymer segments called 'side branches,' chemically identical or different in nature, which are also linear, but significantly shorter than the backbone, attached covalently to said backbone by one of their ends" ([0040], emphasis added).

The comb copolymer side branch requirement, that the side branches be “significantly shorter than the backbone,” is not explicitly defined anywhere within the Viovy reference. There are only a few clues as to what this requirement might mean. The term “short” appears in Viovy's paragraphs [0072], [0118] and [0161] and in his claim 17.

Viovy's paragraph [0072] and claim 17 simply repeat his requirement that the “side segment” contain “short chains.” In Viovy paragraphs [0118] and [0161], Aqualon's polymer Natrosol Plus 331 is taught to be a comb polymer with a hydroxyethylcellulose backbone “carrying side chains of the 'short' alkyl chain type.” It is known to the art, e.g., pursuant to WO 2006/094582 A1, a copy of which is attached hereto for the Examiner's convenience as Exhibit 1, that Natrosol Plus 331 is a “cellulose ether … hydrophobically modified by further substitution with one or more hydrocarbon radicals having about [sic.] 10 to 24 carbon atoms” (page 2, lines 22-31). Thus, for the sake of argument, if the longest possible side branch for Natrosol Plus 331 disclosed by WO 2006/094582 A1 was formed by joining all 24 carbon atoms end-to-end, an ethylene monomer unit chain containing only 12 ethylene units would result.

Certain of Viovy's examples may provide another clue as to what his requirement for the side branches to be “significantly shorter than the backbone” might mean. Viovy's Example 2 purports to describe the preparation of a comb copolymer with a PDMA backbone [0151]. This comb copolymer has branches arising from “PNIPAM-C.” NIPAM, which does not appear to be defined by Viovy but could be *N*-*iso*-propylacrylamide, is said to be aminated in [0132]-[0141] then copolymerized with a “great excess” (approximately 20 times that of aminated NIPAM) of acrylic acid in [0142]-[0147] to form the macromonomer PNIPAM-C with an “allyl” functional group at the end of a chain of acrylic acid units. Five other macromonomers were purported to be similarly-formed; the Mw (weight average molecular weight)¹ of Viovy's macromonomers are provided in the row below the temperatures in his Table 1 and range from 10,800 to 34,000 g/mol which Viovy discloses corresponds to 200-620 atoms along the side branch or 100-310 acrylic acid monomer units.

As discussed in the paragraph above, in forming his comb copolymers Viovy copolymerizes, not grafts, the desired selection from one of his synthesized macromonomers with another monomer (a “non-macromonomer”) to form the “backbone” of his comb. The “teeth” of his comb result from the monomer units copolymerized with aminated NIPAM,

¹ As Viovy refers to the weight average in his paragraph [0043], it is assumed only for the sake of argument for the purposes of these remarks that all the non-monomeric molecular weights provided by Viovy are weight average molecular weights.

e.g., acrylic acid monomer units in Example 1. Thus Viovy's comb copolymer's teeth are fixed in their length, number of units, molecular weight distribution and the like, before the preparation of the comb's backbone is even begun. The number of teeth present is influenced by the amount of macromonomer present during the backbone copolymerization. And, because Viovy's comb's backbone must necessarily contain at least two types of monomers (the macromonomer and a "non-macromonomer"), that backbone cannot be considered to be a homopolymer.

This is in contrast to the graft polymer of the invention where, as previously discussed in connection with Tan, the pendants are formed from grafting or graft polymerization of a monomer(s) onto an already polymerized homopolymer or copolymer backbone. (*See, inter alia*, Sections 5.2 and 5.4 of the present specification; examples in Section 6.2 (grafting of polyacrylamide onto a PDMA backbone by polymerizing acrylamide (AAm) in the presence of the PDMA)).

In relation to the disclosures in his examples, the other monomer Viovy copolymerizes, not grafts, with one of his macromonomers is either *N,N*-dimethylacrylamide (in Example 2, [0151]-[0153]) or acrylamide (in Example 4, [0155]-[0156]; Example 8, [0174]-[0175]; and Example 9, [0176]-[0177]). The comb copolymer formed thereby in Example 2, from *N,N*-dimethylacrylamide and Viovy's PNIPAM-C macromonomer of 10,800 Da Mw, has an Mw of 3 MDa [0152]. The Example 4 comb copolymer, formed from acrylamide and Viovy's PDMA macromonomer of unspecified Mw, has Mw of 0.813 MDa [0155]. The Example 8 comb copolymer, formed from acrylamide and Viovy's PDMA macromonomer of unspecified Mw, has Mw of 3 MDa [0174]. The Example 9 comb copolymer, formed from acrylamide and Viovy's PDMA macromonomer of 30,000 Da [0177], has an unspecified Mw.

Viovy teaches that his Example 4 side-branches/teeth-significantly-shorter-than-the-backbone comb copolymer has a "mass proportion of pDMA (i.e., side branches) ... of 6.5%" [0156]. The mass proportion of side branches (consisting essentially of acrylic acid units) in Viovy's Example 2 side-branches/teeth-significantly-shorter-than-the-backbone comb copolymer is disclosed to be 6.5% [0152]. That the disclosed 6.5% is actually a weight percent is evident from the following calculation relating to Viovy Example 2 by first noting that Viovy discloses his Example 2 comb copolymer has 18 side branches [0152]:

$$\frac{(18 \text{ side branches} \times 10,800 \text{ g/mol side branches})}{3,000,000 \text{ g/mol Example 2 comb copolymer}} \times 100 = 6.5\%$$

In contrast, the “mass proportion of side branches” of, e.g., the exemplified poly(M_1 -g- M_2) graft polymers, is far greater than of Viovy's comb copolymers or of Natrosol Plus 331.

Specifically, the poly(M_1 -g- M_2) graft polymers GC1 and GC2 have backbone molecular weights of about 1.48 MDa and 2.15 MDa, respectively (page 45, lines 33-34). Each was prepared from a PDMA backbone polymer with a Mw of 0.984 MDa (page 45, lines 17-18; page 46, lines 13-16). From this data, the weight proportion of pendants can be calculated as illustrated in the following table:

Poly(M_1 -g- M_2)	Mw of Poly(M_1 -g- M_2) (MDa) (Col 2)	Mw of Backbone (MDa) (Col 3)	Mw of Pendants (MDa) (Col 2 - Col 3)	Weight Proportion of Pendant (Col 4/Col 2)
GC1	1.48	0.984	0.496	0.34
GC2	2.15	0.984	1.166	0.54

As is immediately apparent from the final column of the table above, the weight percent of pendant is far greater, 34% and 54% for GC1 and GC2, respectively, than the 6.5% proportion of side branches for the Viovy side-branches/teeth-significantly-shorter-than-the-backbone comb copolymers for which this value is even provided by Viovy.

Thus, for all of these reasons, Applicant respectfully submits that Viovy fails to anticipate, or even suggest, the present claims. Withdrawal of the rejection of claims 24-26, 28, 29 and 31-51 under 35 U.S.C. § 102(a) is therefore respectfully requested.

V. CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that all of the rejections have been overcome and should be withdrawn. Thus, reconsideration and early allowance of all of the claims are respectfully requested.

Other than the separately-provided-for fees for the petition to extend the time to respond to the Office Action and for one (1) additional dependent claim, no fee is believed to be due for this response. Should any fee(s) be required, please charge such fee(s) to Jones Day Account No. 50-3013.

Respectfully submitted,

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(54) Title: FABRIC SOFTENING COMPOSITION

(57) Abstract: Aqueous fabric softening composition having good high temperature stability comprising a cationic fabric softening compound and water soluble polysaccharide polymers comprising hydrophobic groups selected from aryl, alkyl, alkenyl, aralkyl each having at least 14 carbon atoms and cationic quaternary ammonium salt groups such that the cationic degree of substitution is from 0.01 to 0.2, the polymers having a molecular weight in the range from 100,000 to 700,000.

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FABRIC SOFTENING COMPOSITION

Technical Field

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The present invention relates to fabric softening compositions. In particular the invention relates to fabric softening compositions that are visually and rheologically appealing to consumers and exhibit good stability.

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Background and Prior Art

It is well known to provide liquid fabric softening compositions that soften treated fabric. Such compositions are typically added to fabric in the rinse cycle of the wash process. It has been observed that consumer preference is for liquid fabric conditioners that appear thick and creamy, cued by having a high viscosity and a high opacity. Conditioners that appear thin and/or translucent/watery may be perceived as being cheap and ineffective, whereas conditioners that appear thick and creamy are perceived as premium products. One route to achieve this is through the use of polymeric viscosity modifiers.

25 Fabric conditioners comprising polymeric viscosity modifiers and cationic softening agent are known in the art. For example, WO-A1-02/081611 discloses a fabric softener composition for the treatment of textile fibre materials in domestic applications comprises a fabric softener and a water-soluble polyurethane
30 obtainable by reaction of (a) a diisocyanate, with (b) a polyether containing at least one hydroxyl group, (c) optionally

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a diol derived from an aliphatic residue having from 2 to 12 carbon atoms, and (d) an agent introducing a water-solubilising group.

5 US 2004/0214736, US6827795, EP0501714, US 2003/0104964 and US 5880084 disclose fabric softening compositions comprising Polyquaternium 24 which is a polymeric quaternary ammonium salt of hydroxyethyl cellulose reacted with lauryl dimethyl ammonium epoxide.

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EP-A2-0385749 discloses fabric conditioning compositions comprising a quaternary ammonium softening material and a polymeric thickener. The thickener has a hydrophilic backbone and two hydrophobic groups attached thereto.

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EP 331237 discloses an aqueous fabric conditioning composition comprising a fabric softener and a non-ionic cellulose ether, characterised in that said non-ionic cellulose ether has a sufficient degree of non-ionic substitution selected from the 20 class consisting of methyl, hydroxyethyl and hydroxypropyl to cause it to be water-soluble and wherein said non-ionic cellulose ether is hydrophobically modified by further substitution with one or more hydrocarbon radicals having about 10 to 24 carbon atoms, in an amount between 0.2% by weight and 25 the amount which renders the cellulose ether less than 1% by weight soluble on water at 20°C. Preferred non-ionic cellulose ethers are hydrophobically modified hydroxyethyl cellulose (HMHEC) commercially available from Hercules Incorporated under the trade designation "Natrosol Plus". Specific examples of 30 HMHEC which have been disclosed in fabric conditioning compositions are Natrosol Plus 330 and Natrosol Plus 331.

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HMHEC polymers achieve viscosity build up by forming links between dispersed particles of the fabric conditioner system i.e. they act as "associative thickener". This is in contrast 5 to "continuous phase thickeners" which work simply by thickening the continuous phase without any association. The benefits of HMHEC's are that they are more weight effective and hence are a more cost effective solution to achieving high product viscosities and also reduces material consumption i.e. better 10 for the environment generally.

Where these polymers have been used previously with dilute products these have generally proven to be most effective at moderate temperatures (<37°C) with softener actives that contain 15 predominantly dialkyl cationic species. At higher temperatures the viscosity tends to decrease significantly before the compositions gel due to hydrolysis. This is disadvantageous especially if the target viscosity is relatively high.

20 In order to maintain the product viscosity, the HMHEC must remain associated or "bound" to the dispersed phase. If the polymer loses this binding, the hydrophobic moieties of the polymer can associate intramolecularly such that the viscosity drops below specification and the product becomes thin and more 25 liable to separation. Another key issue regarding TEAQ type actives is that these actives may contain a significant amount of more water soluble mono-ester components. These components become even more water soluble as the temperature of the system is raised and this is believed to lead to the formation of 30 micellar type structures in the continuous phase. These micelles are believed to facilitate the release of the

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hydrophobic chains of the polymer from the bilayer of the dispersed organic phase. In addition, as the ester linked actives hydrolyse under these high temperature conditions, the more hydrophobic triester and diester species break down to form 5 the mono-ester products, thus exacerbating the problem even further.

The invention has been made with the above points in mind.

10 Summary of the invention

According to the present invention there is provided an aqueous fabric softening composition comprising a cationic fabric softening compound and water soluble polysaccharide polymers 15 comprising hydrophobic groups selected from aryl, alkyl, alkenyl, aralkyl each having at least 14 carbon atoms and cationic quaternary ammonium salt groups such that the cationic degree of substitution is from 0.01 to 0.2, the polymers having a molecular weight in the range from 100,000 to 700,000.

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The compositions of the invention provide improved high temperature stability compared to compositions containing the known HMHEC polymers.

25 Water-soluble polysaccharide polymers

The water-soluble polysaccharide polymers comprise hydrophobic groups selected from aryl, alkyl, alkenyl having at least 14, preferably at least 16 carbon atoms and mixtures thereof and 30 cationic quaternary ammonium salt groups such that the cationic degree of substitution is from 0.01 to 0.2, the polymers having

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a molecular weight in the range from 100,000 to 700,000, preferably 250,000 to 550,000. The polymers are preferably cellulose ethers.

5 The cationic ether modified, hydrophobically modified cellulose ether of the present invention may be produced from readily available materials. Such cellulose ethers are first alkylated with a long chain hydrophobic groups which are then quaternized with a nitrogen-containing compound. The hydrophobe and
10 nitrogen containing compounds are separately attached to the backbone cellulose ether.

The starting materials include water-soluble polysaccharides such as cellulose ethers such as hydroxyethylcellulose (HEC),
15 ethyl hydroxyethylcellulose (EHEC), hydroxypropylmethyl cellulose (HPMC), methyl cellulose (MC), hydroxypropylmethyl cellulose (HPMC), and methyl hydroxyethyl cellulose (MHEC), hydroxyethyl-methylcellulose (HEMC), hydroxyethylcarboxymethylcellulose (HECMC), and guar and guar derivatives and the like. A particularly preferred cellulose ether starting material is hydroxyethylcellulose.

The cationically modified, hydrophobically modified polysaccharide (such as a cellulose ether) of the instant
25 invention is generally prepared through a sequence of reactions which are known in the prior art. A cellulose ether such as hydroxyethylcellulose is first reacted with a hydrophobic moiety such as cetylglycidylether to form the hydrophobically modified cellulose ether. This reaction is preferably conducted so that
30 the hydrophobe content is in the range 0.5 to 2.5 weight percent, preferably from 1 to 2 weight percent. This

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hydrophobically modified cellulose ether is then reacted in a separate reaction with a quaternary ammonium salt such as glycidyltrimethyl ammonium chloride in order to add the cationic moiety to the backbone of the hydrophobically modified cellulose 5 ether. In this step, a sufficient amount of the cationic moiety is added to the backbone cellulose ether so that the cationic degree of substitution (DS) is in the range 0.01 to 0.2, preferably 0.02 to 0.1.

10 The hydrophobe moieties are hydrocarbons of alkyl, aryl, alkenyl, or aralkyl groups having at least 14 carbon atoms, preferably at least 16 carbons in the chain. Generally, the upper limit of the carbon atoms of the hydrocarbon moiety is 24 carbon atoms, preferably 20 carbons, and more preferably 18 15 carbons. The hydrocarbon containing hydrophobe may be unsubstituted, i.e., simply a long chain alkyl group, or substituted with non-reactive groups such as aromatics, i.e., and aralkyl groups. Typical alkylating agents reactive with the cellulose ether hydroxyl groups include halides, epoxides, 20 isocyanates, carboxylic acids, or acid halides.

The cellulose ethers are provided with the quaternary nitrogen-containing substituents through quaternization reactions that may be achieved by reacting the polysaccharides with 25 quaternizing agents which are quaternary ammonium salts, including mixtures thereof, to effect substitution of the polysaccharide with quaternary nitrogen containing groups on the backbone. Typical quaternary ammonium salts that can be used include quaternary nitrogen containing halides, halohydrins, and 30 epoxides. Examples of the quaternary ammonium salts include one or more of the following: 3-chloro-2-hydroxypropyl

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dimethyldodecyl ammonium chloride; 3-chloro-2-hydroxypropyl dimethylocetadecyl ammonium chloride; 3-chloro-2-hydroxypropyl dimethyloctyl ammonium chloride; 3-chloro-2-hydroxypropyl trimethyl ammonium chloride; 2-chloroethyl trimethyl ammonium chloride; 2,3-epoxypropyl trimethyl ammonium chloride; and the like. Preferred quaternization agents include 3-chloro-2-hydroxyupropyl trimethyl ammonium chloride; 3-chloro-2-hydroxypropyl dimethyloctadecyl ammonium chloride; 3-chloro-2-hydroxypropyl dimethyltetradecyl ammonium chloride; 3-chloro-2-hydroxypropyl dimethylhexadecyl ammonium chloride; 3-chloro-2-hydroxypropyl dimethyldodecyl ammonium chloride; and 3-chloro-2-hydroxypropyl dimethyloctadecyl ammonium chloride.

Quaternization can also be achieved using a two-step synthesis
15 of (1) aminating the polysaccharide by reaction with an aminating agent, such as an amine halide, halohydrin or epoxide, followed by (2) quaternizing the product of step (1) by reaction with quaternizing agent, or mixtures thereof, containing a functioning group which forms a salt with the amine.

20 The molecular weight of the polymers is in the range 100,000 to 500,000 Da, preferably 150,000 to 400,000 Da more preferably 250,000 to 350,000 Da. While higher molecular weight polymers may possess viscosity modifying properties they are unsuitable
25 for use in the fabric softening compositions of the invention as the compositions become more difficult to dispense and disperse in the rinse cycle of a washing machine.

Depending upon the target viscosity the polymer will generally
30 be used in an amount of from 0.008 to 1.0% by weight, preferably

- 8 -

0.01 to 0.30% more preferably 0.02 to 0.2% by weight of the fabric softening composition.

Cationic softening agent

5

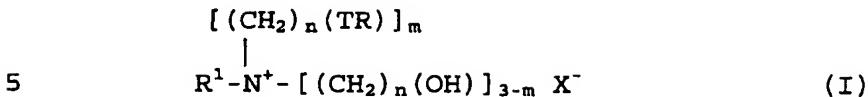
The cationic softening is generally one that is able to form a lamellar phase dispersion in water, in particular a dispersion of liposomes.

10 The cationic softening agent is typically a quaternary ammonium compound ("QAC"), in particular one having two C₁₂₋₂₈ groups connected to the nitrogen head group that may independently be alkyl or alkenyl groups, preferably being connected to the nitrogen head group by at least one ester link, and more
15 preferably by two ester links.

20 The average chain length of the alkyl and/or alkenyl groups is preferably at least C₁₄ and more preferably at least C₁₆. It is particularly preferred that at least half of the groups have a chain length of C₁₈. In general, the alkyl and/or alkenyl groups are predominantly linear.

A first group of QACs suitable for use in the present invention is represented by formula (I):

- 9 -

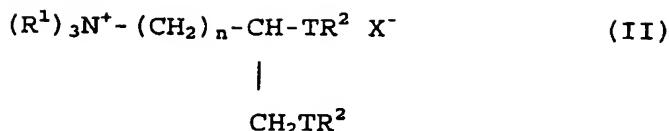


wherein each R is independently selected from a C₅₋₃₅ alkyl or alkenyl group; R¹ represents a C₁₋₄ alkyl, C₂₋₄ alkenyl or a C₁₋₄ hydroxyalkyl group; T is generally O-CO. (i.e. an ester group bound to R via its carbon atom), but may alternatively be CO.O (i.e. an ester group bound to R via its oxygen atom); n is a number selected from 1 to 4; m is a number selected from 1, 2, or 3; and X⁻ is an anionic counter-ion, such as a halide or alkyl sulphate, e.g. chloride or methylsulphate. Di-esters variants of formula I (i.e. m = 2) are preferred and typically have mono- and tri-ester analogues associated with them. Such materials are particularly suitable for use in the present invention.

Especially preferred agents are di-esters of triethanolammonium methylsulphate, otherwise referred to as "TEA ester quats.". Commercial examples include Tetranyl AHT-1, ex Kao, (a di-[hardened tallow ester] of triethanolammonium methylsulphate), AT-1 (di-[tallow ester] of triethanolammonium methylsulphate), and L5/90 (di-[palm ester] of triethanolammonium methylsulphate), both ex Kao, and Rewoquat WE18 (a di-tallow of triethanolammonium methylsulphate), ex Degussa.

The second group of QACs suitable for use in the invention is represented by formula (II):

- 10 -



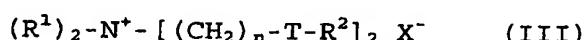
5

wherein each R^1 group is independently selected from C_{1-4} alkyl, hydroxyalkyl or C_{2-4} alkenyl groups; and wherein each R^2 group is independently selected from C_{8-28} alkyl or alkenyl groups; and wherein n , T , and X^- are as defined above.

10

Preferred materials of this second group include 1,2 bis[tallowoyloxy]-3-trimethylammonium propane chloride, 1,2 bis[hardened tallowoyloxy]-3-trimethylammonium propane chloride, 1,2-bis[oleoyloxy]-3-trimethylammonium propane chloride, and 1,2 bis[stearoyloxy]-3-trimethylammonium propane chloride. Such materials are described in US 4,137,180 (Lever Brothers). Preferably, these materials also comprise an amount of the corresponding mono-ester.

20 A third group of QACs suitable for use in the invention is represented by formula (III):



25 wherein each R^1 group is independently selected from C_{1-4} alkyl, or C_{2-4} alkenyl groups; and wherein each R^2 group is independently selected from C_{8-28} alkyl or alkenyl groups; and n , T , and X^- are as defined above. Preferred materials of this third group include bis(2-tallowoyloxyethyl)dimethyl ammonium chloride and
30 hardened versions thereof.

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A fourth group of QACs suitable for use in the invention is represented by formula (IV):



5

wherein each R¹ group is independently selected from C₁₋₄ alkyl, or C₂₋₄ alkenyl groups; and wherein each R² group is independently selected from C₈₋₂₈ alkyl or alkenyl groups; and X⁻ is as defined above. Preferred materials of this fourth group include

10 di(hardened tallow)dimethylammonium chloride.

The iodine value of the softening agent is preferably from 0 to 120, more preferably from 0 to 100, and most preferably from 0 to 90. Essentially saturated material, i.e. having an iodine 15 value of from 0 to 1, is used in especially high performing compositions. At low iodine values, the softening performance is excellent and the composition has improved resistance to oxidation and associated odour problems upon storage.

20 Iodine value is defined as the number of grams of iodine absorbed per 100 g of test material. NMR spectroscopy is a suitable technique for determining the iodine value of the softening agents of the present invention, using the method described in Anal. Chem., 34, 1136 (1962) by Johnson and 25 Shoolery and in EP 593,542 (Unilever, 1993).

References to levels of cationic softening agent in this specification are to the total level of cationic softening agent, including all cationic components of a complex raw 30 material that could enter the aqueous lamellar phase together.

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With a di-ester softening agent, it includes any associated mono-ester or tri-ester components that may be present.

For ease of formulation, the amount of softening agent is generally 50% or less, particularly 40% or less, and especially 30% or less by weight of the total composition. The preferred compositions contain from 0.5 to 8% by weight of softening agent.

10 Non-ionic surfactant

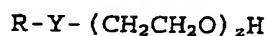
A non-ionic surfactant may be present in order to stabilise the composition, or perform other functions such as emulsifying any oil that may be present.

15

Suitable non-ionic surfactants include alkoxylated materials, particularly addition products of ethylene oxide and/or propylene oxide with fatty alcohols, fatty acids and fatty amines.

20

Preferred materials are of the general formula:



25 Where R is a hydrophobic moiety, typically being an alkyl or alkenyl group, said group being linear or branched, primary or secondary, and preferably having from 8 to 25, more preferably 10 to 20, and most preferably 10 to 18 carbon atoms; R may also be an aromatic group, such as a phenolic group, substituted by
30 an alkyl or alkenyl group as described above; Y is a linking group, typically being O, CO.O, or CO.N(R¹), where R¹ is H or a

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C_{1-4} alkyl group; and z represents the average number of ethoxylate (EO) units present, said number being 8 or more, preferably 10 or more, more preferably 10 to 30, most preferably 12 to 25, e.g. 12 to 20.

5

Examples of suitable non-ionic surfactants include the ethoxylates of mixed natural or synthetic alcohols in the "coco" or "tallow" chain length. Preferred materials are condensation products of coconut fatty alcohol with 15-20 moles of ethylene oxide and condensation products of tallow fatty alcohol with 10-20 moles of ethylene oxide.

The ethoxylates of secondary alcohols such as 3-hexadecanol, 2-octadecanol, 4-eicosanol, and 5-eicosanol may also be used.

15 Exemplary ethoxylated secondary alcohols have formulae C_{12} -EO(20); C_{14} -EO(20); C_{14} -EO(25); and C_{16} -EO(30). Especially preferred secondary alcohols are disclosed in PCT/EP2004/003992 and include Tergitol-15-S-3.

20 Polyol-based non-ionic surfactants may also be used, examples including sucrose esters (such as sucrose monooleate), alkyl polyglucosides (such as stearyl monoglucoside and stearyl triglucoside), and alkyl polyglycerols.

25 Suitable cationic surfactants include single long chain (C_{8-40}) cationic surfactants. The single long chain cationic surfactant is preferably a quaternary ammonium compound comprising a hydrocarbyl chain having 8 to 40 carbon atoms, more preferably 8 to 30, most preferably 12 to 25 carbon atoms (e.g. quaternary 30 ammonium compounds comprising a C_{10-14} hydrocarbyl chain are especially preferred).

Examples of commercially available single long hydrocarbyl chain cationic surfactants which may be used in the compositions of the invention include: ETHOQUAD (RTM) 0/12 (oleylbis(2-hydroxyethyl)methylammonium chloride); ETHOQUAD (RTM) C12 (cocobis(2-hydroxyethyl)methyl ammonium chloride) and ETHOQUAD (RTM) C25 (polyoxyethylene(15)cocomethyl-ammonium chloride), all ex Akzo Nobel; SERVAMINE KAC (RTM), (cocotrimethylammonium methosulphate), ex Condea; REWOQUAT (RTM) CPEM, (coconutalkylpentaethoxymethylammonium methosulphate), ex Witco; cetyltrimethylammonium chloride; RADIAQUAT (RTM) 6460, (coconut oil trimethylammonium chloride), ex Fina Chemicals; NORAMIUM (RTM) MC50, (oleyltrimethylammonium chloride), ex Elf Atochem.

15 Optionally, the composition comprises an emulsifier that has an HLB of from 7 to 20, more preferably from 10 to 20, and most preferably from 15 to 20.

A particular surfactant may be useful in the present compositions alone or in combination with other surfactants. The preferred amounts of non-ionic surfactant indicated below refer to the total amount of such materials that are present in the composition.

25 When present, the total amount of non-ionic surfactant is generally from 0.05 to 10%, usually 0.1 to 5%, and often 0.35 to 3.5%, based on the total weight of the composition. If an oil is present in the composition, the weight ratio of the total amount of non-ionic surfactant to the amount of emulsified oil is preferably from 1:30 to 1:1, in particular from 1:25 to 1:5, and especially from 1:20 to 1:10.

Aqueous base

The compositions of the invention are typically aqueous.

5

The aqueous base typically comprises 80% or greater by weight of water; sometimes this figure may rise to 90% or greater, or 95% or greater. The water in the aqueous base typically comprises 40% or greater by weight of the total formulation; preferably 10 this figure is 60% or greater, more preferably it is 70% or greater.

The aqueous base may also comprise water-soluble species, such as mineral salts or short chain (C_{1-4}) alcohols. The mineral 15 salts may aid the attainment of the desired viscosity for the composition, as may water soluble organic salts and cationic deflocculating polymers, as described in EP 41,698 A2 (Unilever). Such salts may be present at from 0.001 to 1% and preferably at from 0.005 to 0.1% by weight of the total 20 composition. Examples of suitable mineral salts for this purpose include calcium chloride, magnesium chloride and potassium chloride. Short chain alcohols that may be present include primary alcohols, such as ethanol, propanol, and butanol, secondary alcohols such as isopropanol, and polyhydric 25 alcohols such as propylene glycol and glycerol. The short chain alcohol may be added with cationic softening agent during the preparation of the composition.

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Fatty complexing agent

A preferred additional component in the compositions of the
5 present invention is a fatty complexing agent. Such agents typically have a C₈ to C₂₂ hydrocarbyl chain present as part of their molecular structure. Suitable fatty complexing agents include C₈ to C₂₂ fatty alcohols and C₈ to C₂₂ fatty acids; of these, the C₈ to C₂₂ fatty alcohols are most preferred. A fatty
10 complexing agent is particularly valuable in compositions comprising a QAC having a single C₁₂₋₂₈ group connected to the nitrogen head group, such as mono-ester associated with a TEA ester quat. or a softening agent of formula II, for reasons of product stability and effectiveness.

15

Preferred fatty acid complexing agents include hardened tallow fatty acid (available as Pristerene, ex Uniqema).

Preferred fatty alcohol complexing agents include C₁₆/C₁₈ fatty
20 alcohols (available as Stenol and Hydrenol, ex Cognis, and Laurex CS, ex Albright and Wilson) and behenyl alcohol, a C₂₂ fatty alcohol, available as Lanette 22, ex Henkel.

The fatty complexing agent may be used at from 0.1% to 10%,
25 particularly at from 0.2% to 5%, and especially at from 0.3 to 2% by weight, based on the total weight of the composition.

Perfume

30 The compositions of the invention typically comprise one or more perfumes. The perfume is preferably present in an amount from

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0.01 to 10% by weight, more preferably 0.05 to 5% by weight, most preferably 0.5 to 4.0% by weight, based on the total weight of the composition.

5 Co-softener

Co-softeners may be used together with the cationic softening agent. When employed, they are typically present at from 0.1 to 20% and particularly at from 0.5 to 10%, based on the total 10 weight of the composition. Preferred co-softeners include fatty esters, and fatty N-oxides.

Fatty esters that may be employed include fatty monoesters, such as glycerol monostearate, fatty sugar esters, such as those 15 disclosed WO 01/46361 (Unilever).

Further Optional Ingredients

The compositions of the invention may contain one or more other 20 ingredients. Such ingredients include preservatives (e.g. bactericides), pH buffering agents, perfume carriers, fluorescers, colourants, hydrotropes, antifoaming agents, anti-redeposition agents, soil-release agents, polyelectrolytes, enzymes, optical brightening agents, anti-shrinking agents, 25 anti-wrinkle agents, anti-spotting agents, anti-oxidants, sunscreens, anti-corrosion agents, drape imparting agents, anti-static agents, ironing aids and dyes.

A particularly preferred optional ingredient is an opacifier or 30 pearlescer. Such ingredients can serve to further augment the creamy appearance of the compositions of the invention.

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Suitable materials may be selected from the Aquasol OP30X range (ex Rohm and Haas), the PuriColour White range (ex Ciba) and the LameSoft TM range (ex Cognis). Such materials are typically used at a level of from 0.01 to 1% by weight of the total
5 composition.

Product Use

10 The compositions of the present invention are preferably rinse conditioner compositions and may be used in the rinse cycle of a domestic laundry process.

The composition is preferably used in the rinse cycle of a home textile laundering operation, where, it may be added directly in
15 an undiluted state to a washing machine, e.g. through a dispenser drawer or, for a top-loading washing machine, directly into the drum. Alternatively, it can be diluted prior to use. The compositions may also be used in a domestic hand-washing laundry operation.

20

It is also possible, though less desirable, for the compositions of the present invention to be used in industrial laundry operations, e.g. as a finishing agent for softening new clothes prior to sale to consumers.

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Manufacture

The compositions according to the invention may be prepared by any of the means known in the art. In a preferred method of manufacture of a fabric softening composition, a solution of the polymer is prepared independently of a dispersion of the cationic fabric softening agent and the separate components are then mixed to provide a composition according to the invention.

In practice, the polymer solution is post-dosed into the dispersion with mixing at ambient temperature. Alternatively, after the dispersion of the pre-melted cationic fabric softening agent into an aqueous base, the polymer solution can be added hot using methods known in the art.

Of course, it will be understood that the polymeric thickener can be used in any fabric treatment composition where a thick and creamy product which remains dispensable is desired.

Examples

The invention is further illustrated by the particular (non-limiting) examples described below. All amounts indicated are weight percentages of the total composition, unless otherwise indicated.

The polymers used in the Examples were as follows:

- 20 -

polymer	Hydrophobe type	Hydrophobe wt %	Cat-DS	HE-MS	Approx. Mol wt
control	C16	0.6	0	3.3	370,000 Dalton
A	C16	1.35	0,05	3.91	440,000 Dalton
B	C16	1.35	0,01	3.91	440,000 Dalton

Cat-DS is the degree of cationic substitution.

5 HE-MS is the extent of hydroxyethyl molar substitution.

The following formulations were prepared:

Raw Material	Example A	Example 1
HTTEAQ	4.88%	4.88%
Hydrenol D	0.35%	0.35%
Perfume	0.3%	0.3%
Polymer	0.06% CP	0.075% Polymer A
Minors (Dye, preservative)		
Water	To 100%	To 100%

10

HTTEAQ is hardened tallow triethanolamine quaternary based on reaction of approximately 2 moles of hardened tallow fatty acid with 1 mole triethanolamine; the subsequent reaction mixture being quaternised with dimethyl sulphate (final raw material is 85% active ingredients, the remaining 15% being IPA).

15 Hydrenol D is fully hardened C₁₆-C₁₈ fatty alcohol (100% active ingredients) ex Cognis.

20 The formulations were stored at different temperatures and the viscosity measured on a Haake Viscometer at a shear rate of 10⁶ s⁻¹.

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Example A

5

Temperature	Time t=0 (initial)	1 wk	4 wks	9 wks	12 wks
5°C	142	120	120	120	120
20 °C	142	130	138	143	141
37 °C	142	130	137	67	148
40 °C	142	128	145	88	93

Example 1

Temperature	Time t=0 (initial)	1 wk	4 wks	8 wks	10 wks	12 wks
5°C	125	166	160	180	174	174
20 °C	125	182	150	170	174	172
37 °C	125	208	160	174	165	140
40 °C	125	195	148	160	140	140

10 Example A thickened with the Control Polymer starts to lose viscosity (up to 50%) for the reasons explained above; ie polymer detachment, hydrolysis of the active, and possibly even hydrolysis of the polymer backbone also. Conversely, the polymer thickened with the cationic, hydrophobically modified HEC maintains its viscosity up to 12 weeks at 40°C.

15

The following formulations were prepared:

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Raw Material	Example B	Example C	Example 3	Example 4
HTTEAQ	4.88%	4.88%	4.88%	4.88%
Hydrenol D	0.35%	0.35%	0.35%	0.35%
Perfume	0.3%	0.3%	0.3%	0.3%
Polymer	0.05% CP	0.131% CP	0.15% Polymer B	0.20% Polymer B
Silicone	-	2.78%	-	2.78%
Minors (Dye, preservative)				
Water	To 100%	To 100%	To 100%	To 100%

Silicone is a high molecular weight PDMS silicone oil (60%
 5 silicone oil) emulsified with nonionic ethoxylate surfactants as
 described in WO03022969 A1.

Example B

Temperature	Time t=0 (initial)	1 wk	2 wks	4 wks	8 wks	12 wks
5°C	165	-	-	-	102	98
20 °C	165	106	105	101	111	121
37 °C	165	120	122	130	50	85
41 °C	165	126	120	129	63	gel

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Example C

Temperature	Time t=0 (initial)	1 wk	2 wks	4 wks	8 wks	12 wks
5°C	150	-	125	-	-	126
20 °C	150	107	98	-	30	56
37 °C	150	158	-	105	34	30
41 °C	150	165	167	80	30	315

Example 3

Temperature	Time t=0 (initial)	1 wk	2 wks	4 wks	8 wks	12 wks
5°C	136	137	130	144	140	140
20 °C	136	149	128	130	120	120
37 °C	136	120	124	131	130	104
41 °C	136	123	127	138	90	105

5

Example 4

Temperature	Time t=0 (initial)	1 wk	2 wks	4 wks	8 wks	12 wks
5°C	201	260	252	253	260	270
20 °C	201	228	227	235	250	255
37 °C	201	246	223	206	200	197
41 °C	201	247	220	195	182	150

Comparison of Example 3 with Example B and Example 4 with Example C shows a clear high temperature stability benefit from 10 the use of the cationically modified polymers. The amount of viscosity loss at high temperatures is significantly reduced prior to the onset of gellation.

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CLAIMS

1. An aqueous fabric softening composition comprising a cationic fabric softening compound and water soluble polysaccharide polymers comprising hydrophobic groups selected 5 from aryl, alkyl, alkenyl, aralkyl each having at least 14 carbon atoms and cationic quaternary ammonium salt groups such that the cationic degree of substitution is from 0.01 to 0.2, the polymers having a molecular weight in the range from 100,000 to 700,000.
- 10 2. An aqueous fabric softening composition in which the hydrophobic groups comprise at least 16 carbon atoms.
- 15 3. An aqueous fabric softening composition as claimed in Claim 1 or Claim 2 in which the cationic degree of substitution is from 0.02 to 0.1.
- 20 4. An aqueous fabric softening composition as claimed in any preceding claim in which the polymer has a molecular weight of at least 150,000 Da
- 25 5. An aqueous fabric softening composition as claimed in Claim 4 in which the hydrophobic groups comprise alkyl groups of 16 carbon atoms.
6. An aqueous fabric softening composition as claimed in any preceding claim in which the hydrophobic group comprise from 1.0 to 2.5% by weight of the polymer.

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7. An aqueous fabric softening composition as claimed in any preceding claim in which the polymer has a molecular weight of from 250,000 to 550,000 Da.
- 5 8. An aqueous fabric softening composition as claimed in any preceding claim in which the polymer is present in an amount of from 0.008 to 1% by weight of the composition.
- 10 9. An aqueous fabric softening composition as claimed in Claim 8 in which the polymer is present in an amount of from 0.002 to 0.3% by weight of the composition.
- 15 10. An aqueous fabric softening composition as claimed in any preceding claim in which the fabric softening compound is a quaternary ammonium compound.
11. An aqueous fabric softening composition as claimed in Claim 10 in which the fabric softening compound comprises a quaternary ammonium compound with ester linkages.
- 20 12. An aqueous fabric softening composition as claimed in Claim 11 in which the fabric softening compound comprises a tallow based triethanolamine ammonium compound.
- 25 13. An aqueous fabric softening composition as claimed in any preceding claim in which the fabric softening compound is present in an amount of from 0.5 to 8% by weight of the composition.

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14. An aqueous fabric softening composition as claimed in any preceding claim which additionally comprises a fatty alcohol or fatty acid containing from 8 to 22 carbon atoms.
- 5 15. An aqueous fabric softening composition as claimed in Claim 14 which comprises from 0.3 to 2% by weight of a C₁₆-C₁₈ fatty alcohol.

INTERNATIONAL SEARCH REPORT

International application No PCT/EP2006/000857
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A. CLASSIFICATION OF SUBJECT MATTER INV. C11D3/22 C11D1/62 C11D3/20		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) C11D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 331 237 A (UNILEVER) 6 September 1989 (1989-09-06) cited in the application page 2, lines 39-55 claims; examples 1,5 ----- WO 01/46360 A (UNILEVER) 28 June 2001 (2001-06-28) page 4, lines 6-29 page 24, lines 8-17 examples ----- EP 0 596 580 A (COOPERATIEVE VERKOOP- EN PRODUCTIEVERENIGING VAN AARDAPPELMEEL) 11 May 1994 (1994-05-11) page 2, line 40 - page 3, line 5 example 3 ----- -/-	1-15 1-15 1-15 -/-
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.		<input checked="" type="checkbox"/> See patent family annex.
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		
T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family		
Date of the actual completion of the international search	Date of mailing of the international search report	
12 April 2006	25/04/2006	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Bertran Nadal, J	

INTERNATIONAL SEARCH REPORTInternational application No
PCT/EP2006/000857**C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 379 394 B1 (CHILOU EMMANUELLE ET AL) 30 April 2002 (2002-04-30) column 1, lines 13-33 column 2, lines 37-54 column 3, lines 8-14 example 3 -----	1-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No	
PCT/EP2006/000857	

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
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